

# NON-COMMUNICABLE DISEASES IN THE ASIA-PACIFIC REGION: PREVALENCE, RISK FACTORS AND COMMUNITY-BASED PREVENTION

WAH-YUN LOW, YEW-KONG LEE, and ALEXANDER LOURDES SAMY

University of Malaya, Kuala Lumpur, Malaysia  
Faculty of Medicine

## Abstract

Non-communicable diseases (NCDs) lead to substantial mortality and morbidity worldwide. The most common NCDs are cardiovascular diseases (CVD), diabetes, cancer and chronic respiratory diseases. With the rapid increase in NCD-related deaths in Asia Pacific countries, NCDs are now the major cause of deaths and disease burden in the region. NCDs hamper achievement of the Millennium Development Goals (MDG). People in the low socio-economic group are most affected by NCDs as they have poor access to policies, legislations, regulations and healthcare services meant to combat NCDs. This results in loss of productivity by a decreasing labor force with implications at the macroeconomic level. The 3 major NCDs in the Asia Pacific region are CVDs, cancer and diabetes due to the increasing loss of disability adjusted life years (DALYs). The 4 major behavioral risk factors for NCDs are: tobacco use, alcohol consumption, inadequate physical activity and unhealthy diet. The underlying risk factors are urbanization, globalization, sedentary lifestyle, obesity and hypertension. Strategies to combat NCDs in the Asia Pacific region are as follows: population-based dietary salt reduction, health education, psychological interventions, i.e., cognitive behavioral therapy and motivational-interviewing, taxation and bans on tobacco-related advertisements, implementing smoke-free zones and surveillance by the World Health Organization. Control measures must focus on prevention and strengthening inter-sectorial collaboration.

## Key words:

Non-communicable diseases (NCDs), Urbanization, Hypertension, Obesity, Community-based prevention, Inter-sectorial collaboration

## INTRODUCTION

Non-communicable diseases (NCDs) are the pivotal cause of disease burden and mortality in the Asia Pacific region, claiming 55% of total life in the South East Asia region each year and 75% in the Western Pacific region [1,2]. The Asia Pacific region is experiencing a rapid increase in NCD-related deaths; the World Health Organization estimates that the highest worldwide increment in total

mortality in a 10-year time frame (2005–2015) will be observed in the South-East Asia and Western Pacific regions with 21% increase in the South-East Asia region [3] and 12.3 million deaths in the Western Pacific region [2]. This increase in NCDs presents a major barrier to global development, specifically to the achievement of the Millennium Development Goals [4] in low-and-middle income countries.

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Corresponding author: W.-Y. Low, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia (e-mail: lowwy@um.edu.my).

### THE BIG THREE IN THE ASIA PACIFIC REGION: CARDIOVASCULAR DISEASES (CVDS), DIABETES, CANCER

Cardiovascular diseases, diabetes and cancer constitute the Asia Pacific region's biggest NCD challenges. The total number of disability adjusted life years (DALYs) lost due to these 3 diseases is significantly higher compared to other NCDs. For example, between 1990 and 2010, the DALYs due to CVDs, diabetes mellitus and cancer increased by 22.6%, 69% and 27.3%, while it decreased by 2% due to respiratory diseases [5].

In particular, the Asia Pacific region is severely affected by the burden from CVDs. The total number of DALYs lost to CVDs in this region constituted more than 50% of the worldwide sum of DALYs lost to CVDs in 2005 [6]. The Maldives had the highest female age-standardized death rate for ischemic heart disease (218 per 100 000), while Fiji had the highest rate for males (304 out of 100 000) [6]. The highest rate for stroke was also reported in the Asia Pacific region – Mongolia recorded the highest female age-standardized death rate for stroke (189 out of 100 000), while Sri Lanka had the highest rate for males (256 out of 100 000) [6].

Similar figures with respect to diabetes in the region are also alarming. Between 2000 and 2010, the Asia Pacific region alone experienced a 57% increase in the absolute number of people with diabetes, from 84.5 to 132.3 million. Currently, population prevalence rates are as high as 31% in Nauru, and 10–14% in French Polynesia, Tuvalu, Tonga, Brunei, Malaysia and Singapore [7]. Combining impaired glucose tolerance (IGT) and diabetes, more than 50% of the population in Nauru are affected [7]. Most patients with diabetes have poor glycemic control, which contributes to the microvascular and neurological complications of the disease, as well as the progression from pre-diabetes. In China, 40% of diabetic patients have poor control as measured by glycated hemoglobin (HbA1c > 7.5%) [8]. Furthermore, a regional study reported that 79% of

patients have HbA1c > 7% [9]. Table 1 shows mortality rates for cardiovascular diseases and diabetes in selected countries from the Asia Pacific region in 2008.

Cancer accounts for 13% of all deaths in the Asia Pacific region. Worldwide, 70% of all cancer-related deaths occurred in low-and middle- income countries where access to healthcare resources is poor. In 2000, there were 4.3 million cases resulting in 2.9 million deaths from cancer in the Asia Pacific region, with lung cancer being the most prevalent [10]. Indeed, tobacco use remains the major avoidable risk factor for cancer. This includes tobacco chewing, which is the leading cause of oral cancer. In addition, high

**Table 1.** Mortality rate due to cardiovascular diseases and diabetes in selected countries in the Asia-Pacific region in 2008 [11]

Country	Mortality (death per 100 000 people) (n)	
	male	female
Australia	136	89
Bangladesh	447	388
Cambodia	480	339
China	312	260
Fiji	580	328
India	386	283
Indonesia	400	300
Japan	118	65
Malaysia	319	286
Myanmar	412	327
Nauru	922	473
Pakistan	455	388
Papua New Guinea	460	395
Republic of Korea	168	115
Samoa	477	374
Singapore	171	179
Sri Lanka	385	241
Thailand	343	280
Tuvalu	606	568
Viet Nam	382	289

**Table 2.** Mortality rate due to cancer in selected countries in the Asia Pacific region in 2008 [11]

Country	Mortality (death per 100 000 people) (n)	
	male	female
Australia	141	93
Bangladesh	105	107
Cambodia	145	90
China	182	105
Fiji	106	122
India	79	72
Indonesia	136	109
Japan	150	77
Malaysia	119	90
Myanmar	123	115
Nauru	115	191
Pakistan	95	94
Papua New Guinea	152	107
Republic of Korea	191	77
Samoa	69	40
Singapore	142	91
Sri Lanka	90	78
Thailand	115	96
Tuvalu	107	154
Viet Nam	137	94

rates of nasopharyngeal cancer were reported for some parts of China and Southeast Asia, with the main risk factors being smoking and alcohol intake [6]. Table 2 presents mortality rates for cancer in selected countries in the Asia Pacific region.

### RISK FACTORS FOR NCDs IN THE ASIA PACIFIC REGION

Risk factors for NCDs include underlying factors (e.g., social determinants, globalization, urbanization, ageing),

behavioral risk factors (e.g., unhealthy diet, tobacco use, sedentary lifestyle) and metabolic/physiological risk factors (e.g., increased blood glucose, increased blood pressure, obesity and raised lipids) [12]. These risk factors combine into a series of critical pathways which result in NCDs such as: diabetes, ischemic heart disease, cancer, stroke and chronic lung diseases [13].

The major underlying risk factor for the rise in NCDs in the Asia Pacific region is the socio-cultural epidemiological transition. As a result of economic development, the region has undergone drastic changes in the lifestyle and nutrition of its population. Thus, an increase in NCDs, including obesity and diabetes, has paralleled the growth of urbanization and globalization in the region. In China, the prevalence rates of diabetes in large provincial capital cities range from a high of 8% (in the Eastern region) to 4.6% (the lowest in the Western region) [14].

Behavioral risk factors include tobacco use, alcohol consumption, unhealthy diet and physical inactivity. In fact, the impact of the global tobacco epidemic is the most severe in the Asia Pacific region. Tobacco use is the highest in developing countries (75% of all worldwide users) with 2.3 million tobacco-related premature deaths annually in the Asia Pacific region [15]. It is the 2nd major cause of all deaths from NCDs and the 4th most common risk factor for the diseases worldwide [2].

For alcohol consumption, the total DALYs lost due to harmful alcohol use was 4.5%, with cancer, CVDs and liver disease comprising a quarter of this burden [16]. In a study conducted in Japan, the prevalence of colorectal cancer attributable to alcohol intake and smoking was 46%. Moreover, consumption of alcohol of 300 g/week or above contributed to a 3-fold higher risk of colorectal cancer (odds ratio (OR) = 3; 95% confidence interval (CI): 1.8–5.1) [17].

Physical inactivity is the 4th leading risk factor for mortality, accounting for 32.1 million total DALY lost [16]. People who do not have sufficient physical activity have

a 20–30% increased risk of mortality compared to those who engage in an exercise regime that lasts at least 30 min a day [18]. A study on Asian countries via a health surveillance database reported that a quarter of men and a 3rd of women were physically inactive [18].

As mentioned before, there has also been a major nutritional shift in the traditional Asian and Western Pacific diets with rapid urbanization due to economic prosperity [20]. At the same time, consumption of traditional Asian foods, such as pickles, sa-um or smoked dried meat and dried fish have been implicated with stomach cancer which is quite high in several countries in the region, especially: Iran, Central Asian Republic, China, Korea and Japan [21]. The bacteria *Helicobacter pylori*, is responsible for this type of cancer and the spread of this specific infection is very well known due to dietary habits.

Looking at obesity as a risk factor, it was projected that in Australia by 2015, 75% of women aged 30 and above will be overweight (body mass index (BMI) > 25) [22], with 50% of overweight women in the Southeast Asian countries of Malaysia, Thailand, Myanmar and Vietnam [23]. In many countries of the Asia Pacific region, obesity is a rising public health concern directly associated with NCDs, notably, diabetes, hypertension, dyslipidemia and coronary heart disease. In this regard, the Maldives reported the highest prevalence of obesity within the Asia Pacific region, with 60.8% of males and 65.5% of females being overweight and obese [24].

Finally, CVDs are attributable to hypertension [25]. This condition is getting prevalent worldwide, not only in the developed nations. One third of deaths in the middle income countries were caused by CVDs due to hypertension [25]. In a study across the Asia Pacific region, compared to normal blood pressure, prehypertension as well as other types of hypertension were clearly associated with an increased risk of CVDs, adjusted for age, sex, cholesterol and smoking [26].

### STRATEGIES TO TACKLE THE INCREASE IN NCDs

The alarming rise in mortality and morbidity due to NCDs in the Asia Pacific region warrants comprehensive multi-level strategies beginning at the individual up to the population level. As low-and middle-income countries face the biggest threat, emphasis needs to be given to cost-effective population-wide prevention and health programs to improve the quality of life. Cost-effective interventions do exist and are effective regardless of the income level of a country. What is needed are high levels of evidence-based planning, commitment, community mobilization and profound focus on a small range of critical actions [12].

One measure to reduce CVDs via preventing hypertension risk is population-based dietary salt reduction. A randomized controlled trial on reducing salt consumption among free-dwelling people in 2 rural villages in north-eastern Japan resulted in a significant decrease in systolic blood pressure in the intervention group; from 127.9 mm Hg to 125.2 mm Hg (2.7 mm Hg decrease; 95% CI: -4.6 to -0.8) [27]. This action could be augmented by legislating reduced salt in processed and fast foods, which have become popular among people in Asian Pacific countries [28, 29].

Education on blood pressure, cholesterol and weight should be emphasized at school level as it serves as an appropriate place for health promotion and education so as to reduce the risks of CVDs. Advocating people to practice a healthy lifestyle through education (in and out of school) as well as through health promotion campaigns and support groups is deemed necessary. An intervention program conducted in India, namely MARG (Medical education for children / Adolescents for Realistic prevention of obesity and diabetes and for healthy aGeing), resulted in children (aged 8–11 years old) with 15% improvement in knowledge regarding trans-fatty acid, obesity, diabetes, physical activity and blood pressure. An additional 10% of the students regarded steaming of food as a healthy cooking method and preferred outdoor games compared to the indoor ones [29].

Tackling consumption of tobacco in the Asia Pacific region requires strong policy interventions. Taxation has proven to be an effective way to control tobacco use. An increment of 10% in cigarette price was shown to reduce cigarette demand by 2–8% in low-and-middle income countries. Thanks to this measure, youths, minorities and low-income smokers were more likely to use less tobacco [30]. Furthermore, 1/3 of tobacco experimentation among youths occurs due to tobacco advertising, promotion and sponsorship (TAPS). Therefore, comprehensive bans on TAPS need to be implemented in all Asia Pacific countries in order to limit initiation of tobacco consumption [31]. Establishing smoke-free zones has also decreased the probability of tobacco use. A cross-sectional study in Zhejiang, China, has revealed that places with a complete indoor smoking ban were 5 times more likely to be smoke-free compared to the venues without a smoking-ban at the point of survey (OR = 5.39; 95% CI: 1.92–15.14) [32]. Malaysia has imposed a Smoke-Free Legislation (SFL) throughout the country and smoking is prohibited in all air-conditioned premises. Malacca, a popular state for tourism in the country, has adapted the SFL by introducing smoke-free zones in 5 areas of its capital city since June 2011 [33]. Reduction in tobacco-consumption, particularly smoking, can reduce the risk of mortality due to lung cancer within 5-years from smoking cessation [34]. Surveillance serves as a global strategy in preventing and controlling NCDs and their major risk profiles preceding a disease onset, particularly in developing countries [35]. It also serves as a gateway for low- and middle-income countries to embark on chronic disease surveillance activities [36]. A STEPwise approach [37], comprising 3 steps, has been formulated to document, analyze and disseminate data on the established risk profiles that determine the major disease burden in the WHO member countries. Step 1 concerns behaviors (basic demographic information, alcohol consumption, tobacco use, intake of fruit and

vegetables, and physical activity). Step 2 includes physical measurements (weight, height, waist circumference and blood pressure). Step 3 comprises biochemical analyses (fasting blood sugar and total cholesterol). The advantage of this instrument is that it is not limited to monitoring a country's trends in risk factors for NCDs but it can also be used to make cross-country comparisons [38]. On the whole and, particularly in the context of public health, surveillance serves as an important tool in decision-making and monitoring the progress of interventions to control and decrease the emerging epidemics of NCDs.

## CONCLUSIONS

Non-communicable diseases are the leading cause of mortality and morbidity worldwide, especially in the Asia Pacific region. The big three NCDs in the region are cardiovascular diseases, diabetes and cancer. In addition, the prevalence and incidence of these NCDs are rising, particularly in rapidly developing Asia Pacific countries, such as China, India and some ASEAN countries. Sustainable cost-effective and population-wide interventions are deemed useful and practical in the low-and-middle income countries in the Asia Pacific region, with maximum scalability and transferability to all the people regardless of their socio-economic status. Strategies in combating NCDs are not exhaustive. Programs carried out by national and international efforts, such as STEPs by WHO, could serve a larger population at lower cost in maintaining optimal health through the predominant STEPs program.

Clearly, inter-sectorial collaboration, encompassing both health and relevant non-health sectors, is necessary in combating NCDs in the Asia Pacific region. The goal of inter-sectorial collaboration is to achieve increased awareness on health and health-related matters, and health consequences of policy decisions and organizational practices in different sectors, thereby leading towards healthy public practice and policy across various sectors [39,40].

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